WHAT IS CLAIMED:

1. A process for monitoring dewatering in a wet end section of a web production machine, the process comprising:

measuring water flowing into the wet end section;

measuring water flowing out of the wet end section;

detecting conductivity of the wet web entering the wet end section;

measuring conductivity of the water flowing into wet end section;

measuring conductivity of water flowing out of the wet end section; and

determining a water balance from the measured quantities, which is indicative of dewatering in the wet end.

2. The process in accordance with claim 1, wherein the water balance is determined from the equation:

water flow (Win) x conductivity (Cin) = water flow (Wout) x conductivity (Cout) .

3. The process in accordance with claim 2, wherein the water balance is determined after each press in the wet section.

4. The process in accordance with claim 1, wherein the dewatering is monitored in a press section.

5. The process in accordance with claim 4, wherein the press section includes at least one press, at least one felt, at least one suction box, at least one shower nozzle; and at least one press pan, and the process further comprises:

collecting water pressed out in the at least one press in the at least one press pan;

collecting water from the at least one felt with the at least one suction box, wherein the collected water is water flowing out of the press section;

spraying the at least one felt with water from the at least one shower nozzle,

wherein the sprayed water is water flowing into the press section; and

determining the water balance of the press section, which is indicative of the dewatering in the press section.

6. The process in accordance with claim 5, wherein the water balance in the press section is determined by the equations:

(1) Calculated shower water in Uhle flow = Uhle flow x [(sheet conductivity - Uhle conductivity)/(sheet conductivity - shower conductivity)];

(2) Calculated shower water in pan flow = Uhle flow x [(sheet conductivity - pan conductivity)/(sheet conductivity - shower conductivity)];

(3) Sheet water in Uhle flow = Uhle box total - shower flow in Uhle box;

(4) Sheet flow in pan flow = pan total - shower flow in pan;

(5) Exit sheet flow (gpm) = (inlet sheet gpm + shower gpm) - (press pan + Uhle box) gpm - (shower measured gpm - shower calculated gpm); and

(6) Exit sheet dryness = inlet fiber mass/(exit mass of water + fiber),

wherein the Uhle flow and conductivity is from the water collected at least one suction box..

7. The process in accordance with claim 6, wherein the press section comprises a plurality of presses, and the water balance is determined after each press.

8. The process in accordance with claim 6, further comprising measuring the conductivity of the material suspension in the headbox as the conductivity of the web flowing into the press section.

9. The process in accordance with claim 5, wherein at least one of the collected water from the press pan and the collected water from the suction box is collected sectionally in the cross-direction.

10. The process in accordance with claim 9, wherein the conductivity of the at least one sectionally collected water is sectionally determined.

11. The process in accordance with claim 10, wherein the press section includes a plurality of presses, and the water balance is determined sectionally after each press to create a cross-direction water removal profile.

12. The process in accordance with claim 11, wherein the press section includes at least one control unit to monitor the cross-direction water removal profile and selectively adjust parameters to optimize felt life.

13. The process in accordance with claim 11, further comprising measuring the conductivity of the material suspension in the headbox as the conductivity of the web flowing into the press section.

14. The process in accordance with claim 13, wherein the conductivity and water flow of the web entering a subsequent press is calculated from the water balance.

15. The process in accordance with claim 9, wherein the collected water from the press pan and the collected water from the suction box are collected sectionally in the cross-direction, and the conductivity of the sectionally collected water is sectionally determined.

16. The process in accordance with claim 15, wherein a cross-direction profile of the sheet/shower water ratio in the at least one suction box is calculated to determine the cross-direction sheet water removal into the felt.

17. The process in accordance with claim 9, further comprising supplying a suspension from a headbox to form the wet web, wherein the determined conductivity of the wet web entering the wet section corresponds to the conductivity of the suspension in the headbox.

18. The process in accordance with claim 1, wherein the water balance in the wet end section is determined by the equations:

(1) Calculated shower water in Uhle flow = Uhle flow x [(sheet

conductivity - Uhle conductivity)/(sheet conductivity - shower conductivity)];

(2) Calculated shower water in pan flow = Uhle flow x [(sheet conductivity - pan conductivity)/(sheet conductivity - shower conductivity)];

(3) Sheet water in Uhle flow = Uhle box total - shower flow in Uhle box;

(4) Sheet flow in pan flow = pan total - shower flow in pan;

(5) Exit sheet flow (gpm) = (inlet sheet gpm + shower gpm) - (press pan + Uhle box) gpm - (shower measured gpm - shower calculated gpm); and

(6) Exit sheet dryness = inlet fiber mass/(exit mass of water + fiber),

wherein the Uhle flow and conductivity are determined from the water collected at the at least one suction box.

19. The process in accordance with claim 16, wherein the wet end section comprises a plurality of presses, and the water balance is determined after each press.

20. The process in accordance with claim 16, further comprising measuring the conductivity of the material suspension in the headbox as the conductivity of the web flowing into the wet end section.

21. The process in accordance with claim 16, wherein at least one of the collected water from the press pan and the collected water from the suction box is collected sectionally in the cross-direction.

22. The process in accordance with claim 21, wherein the conductivity of the at least one sectionally collected water is sectionally determined.

23. The process in accordance with claim 22, wherein the wet end section includes a plurality of presses, and the water balance is determined sectionally after each press to create a cross-direction water removal profile.

24. The process in accordance with claim 23, wherein the wet end section includes at least one control unit to monitor the cross-direction water removal profile and selectively adjust parameters to optimize felt life.

25. The process in accordance with claim 24, wherein the selectively adjustable parameters include vacuum strength, suction box slot size, nip loading in the press, and shower flow.

26. The process in accordance with claim 23, further comprising measuring the conductivity of the material suspension in the headbox as the conductivity of the web flowing into the wet end section.

27. The process in accordance with claim 23, wherein the conductivity and water flow of the web entering a subsequent press is calculated from the water balance.

28. The process in accordance with claim 20, wherein the collected water from the press pan and the collected water from the suction box are collected sectionally in the cross-direction, and the conductivity of the sectionally collected water is sectionally determined.

29. The process in accordance with claim 28, wherein a cross-direction profile of the sheet/shower water ratio in the at least one suction box is calculated to determine the cross-direction sheet water removal into the felt.

30. The process in accordance with claim 15, wherein the equation conductivity x water flow is additive.

31. The process in accordance with claim 1, wherein, at papermaking pH, conductivity versus dissolved solids is linear.

32. The process in accordance with claim 1, further comprising supplying a suspension from a headbox to form the wet web, wherein the determined conductivity of the wet web entering the wet section corresponds to the conductivity of the suspension in the headbox.

33. The process in accordance with claim 1, wherein water content of the wet web is calculated from a nucleonic measurement of fiber, water, and forming

fabric minus the measured forming fabric minus the fiber weight.

34. An apparatus for monitoring dewatering in a wet end section of a web production machine, comprising:

a device measuring water flowing into the wet end section;

a device for measuring water flowing out of the wet end section;

a device for measuring conductivity of the wet web entering the wet end section;

a device for determining conductivity of the water flowing into wet end section;

a device for measuring conductivity of water flowing out of the wet end section; and

a processing device for determining a water balance from quantities measured by the measuring devices, wherein the determined water balance is indicative of dewatering in the wet end.

35. The apparatus in accordance with claim 34, wherein the wet end section includes a press section comprising:

at least one press;

at least one felt;

at least one suction box arranged to suction said at least one felt;

at least one shower nozzle arranged to spray said at least one felt; and

at least one press pan arranged to collect water removed by the at least one press.

36. The apparatus in accordance with claim 35, wherein the water balance in the press section is determined by the equations:

(1) Calculated shower water in Uhle flow = Uhle flow x [(sheet conductivity - Uhle conductivity)/(sheet conductivity - shower conductivity)];

(2) Calculated shower water in pan flow = Uhle flow x [(sheet conductivity - pan conductivity)/(sheet conductivity - shower conductivity)];

(3) Sheet water in Uhle flow = Uhle box total - shower flow in Uhle box;

(4) Sheet flow in pan flow = pan total - shower flow in pan;

(5) Exit sheet flow (gpm) = (inlet sheet gpm + shower gpm) - (press pan + Uhle box) gpm - (shower measured gpm - shower calculated gpm); and

(6) Exit sheet dryness = inlet fiber mass/(exit mass of water + fiber),

wherein the Uhle flow and conductivity is from the water collected at least one suction box.

37. The apparatus in accordance with claim 36, wherein the press section further comprises a plurality of presses, and the water balance is determined after each press.

38. The apparatus in accordance with claim 37, wherein the conductivity of the material suspension in the headbox is determined as the conductivity of the web flowing into the press section.

39. The apparatus in accordance with claim 36, wherein at least one of the press pan and the suction box are sectionally divided in the cross-direction to sectionally collect the water.

40. The apparatus in accordance with claim 39, wherein the conductivity of the at least one sectionally collected water is sectionally determined.

41. The apparatus in accordance with claim 40, wherein the press section further comprises a plurality of presses, and the water balance is determined sectionally after each press to create a cross-direction water removal profile.

42. The apparatus in accordance with claim 41, wherein the press section further comprises at least one control unit to monitor the cross-direction water removal profile and selectively adjust parameters to optimize felt life.

43. The apparatus in accordance with claim 41, wherein the at least one control unit is arranged to selectively adjust at least one of vacuum strength, suction box slot size, nip loading in the press, and shower flow.

44. The apparatus in accordance with claim 41, wherein the conductivity of the material suspension in the headbox is determined as the conductivity of the web flowing into the press section.

45. The apparatus in accordance with claim 44, wherein the conductivity and water flow of the web entering a subsequent press is calculated from the water balance.

46. The apparatus in accordance with claim 39, wherein the press pan and the suction box are sectionally divided in the cross-direction to sectionally collect the water, and the conductivity of the sectionally collected water is sectionally determined.

47. The apparatus in accordance with claim 46, wherein a cross-direction profile of the sheet/shower water ratio in the at least one suction box is calculated to determine the cross-direction sheet water removal into the felt.

48. The apparatus in accordance with claim 39, said conductivity determining device being positioned to determine the conductivity of a suspension in a headbox, wherein said headbox supplies the suspension to form the wet web.

49. The process in accordance with claim 34, wherein water content of the wet web is calculated from a nucleonic measurement of fiber, water, and forming fabric minus the measured forming fabric minus the fiber weight.